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DISTRIBUTION OF CORPUSCULAR AND LYSED ANTIGENS LABELED WITH RADIOACTIVE ISOTOPES IN A SENSITIZED ORGANISM

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Foreign Technology Division
Wright-Patterson Air Force Base, Ohio

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

* ye initially, after vowels, and after ъ, ь; e elsewhere. When written as ё in Russian, transliterate as yё or ё. The use of diacritical marks is preferred, but such marks may be omitted when expediency dictates.

FOLLOWING ARE THE CORRESPONDING RUSSIAN AND ENGLISH

DESIGNATIONS OF THE TRIGONOMETRIC FUNCTIONS

Russian	English
sin	sin
cos	cos
tg	tan
ctg	cot
sec	sec
cosec	csc
sh	sinh
ch	cosh
th	tanh
cth	coth
sch	sech
csch	csch
arc sin	$\sin^{-1}$
arc cos	$\cos^{-1}$
arc tg	$\tan^{-1}$
arc ctg	$\cot^{-1}$
arc sec	$\sec^{-1}$
arc cosec	$\csc^{-1}$
arc sh	$\sinh^{-1}$
arc ch	$\cosh^{-1}$
arc th	$\tanh^{-1}$
arc cth	$\coth^{-1}$
arc sch	sech^{-1}
arc csch	csch^{-1}
rot	curl
lg	log

DISTRIBUTION OF CORPUSCULAR AND LYSED ANTIGENS LABELED WITH RADIOACTIVE ISOTOPES IN A SENSITIZED ORGANISM

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The question concerning the interrelation between delayed type allergy and immunity continues to remain debatable. Since Koch's time it has been assumed, that allergic inflammation at the site of the repeated administration of the antigen leads to its fixation and limits distribution in the organism.

With the aid of tubercular microbes labeled with radioactive isotopes it was shown (Arkhipova and Uvarova, 1962; Pini and Gambino, 1961) that, administered under the skin or into the peritoneum, they are distributed in the sensitized organism considerably slower than in a healthy one. Similar results were obtained in our experiments on a brucellosis model (Shaposhnikov, 1967).

When using soluble proteins and not microboes as the antigen, contradictory data was obtained. The tuberculin was retained in the skin longer in the sensitized guinea pigs than in the control guinea pigs, but human γ-globulin was resorbed even faster than in the control (Oort and Turk, 1963). According to other data (Foldes, 1965), the distribution of labeled tuberculin in the organs of animals sick with tuberculosis proved to be the same as in healthy animals.

We assigned ourselves the task of comparing the distribution of the labeled corpuscular and soluble antigen, using one form of animals and one model of allergic sensitization.

The experiments were carried out on adult guinea pigs 350-500 g in weight. With the aim of the sensitization of the animals, brucellosis vaccine BA-19 in a dose of 1 bil. microbe cells was administered subcutaneously. The propagation of antigens was studied after 60-74 days after sensitization. The Brucella were labeled S^{35} and P^{32} by a previously described procedure (Khrushchev and co-auth., 1965). A suspension of living Brucella of the BA-19 strain with a radioactivity of 40,000-60,000 pulses per minute for 1 billion microbe cells was used as the corpuscular allergen. The lysed allergen was prepared from labeled Brucella of strain SP (Prof. I. Parnas) by the Buaven procedure in modification of the Slabosnitskiy procedure. The allergens were administered subcutaneously into the right inguinal region. The dose of corpuscular allergen per 1 g of weight of the animal was 400, the dose of the lysed was 200 impulses.

The animals were killed after 30 min, 6 hours, 24 hours, and 6 days after the administration of the allergen. In the animals which were killed after 6 days, the reduction in radioactivity at the site of the administration with the aid of a remote β-probe was investigated. Urine was collected in the exchange cells of these animals and its radioactivity was measured. The radioactivity was calculated on the entire isolated quantity of urine.

The blood was taken at the moment of the slaughter of the animals. The radioactivity was determined by an MST-17 counter, the PP-16 unit was used as a scaler. All the radiometric measurements were made from calculation on 100 mg of the damp weight of the organ or tissue.

In all, 204 guinea pigs were used in the experiments. During each investigation period the animals were killed in groups, 20-28 normal and 14-23 sensitized, to whom the corpuscular allergen was administered, while in the animal groups that received the lysed allergen, up to 5 pigs.

During allergic inflammation the rate of the removal of the corpuscular antigen from the site of administration sharply slowed down. The lysed antigen in the healthy animals moved away from the site of administration approximately at the same rate as the corpuscular (Fig. 1). The delay of the lysed antigen in the sensitized animals was distinctly revealed: the distinctions as compared with healthy pigs during all periods were statistically reliable (t from 6.4 to 4.3), but after 6 days in the sensitized pigs twice as much antigen remained at the site of the administration, than in the control pigs. At the same time the lysed antigen was absorbed somewhat faster than the corpuscular antigen.

The radioactivity nearest to the site of the administration of the antigen of the lymphatic nodes changed quite differently (Fig. 2). During the administration of the corpuscular antigen the radioactivity was significantly higher in the control animals, than in those which were sensitized. Apparently, the bulk of the microbe cells was delayed at the site of the administration and did not enter the lymphatic nodes. The lysed antigen also was delayed at the site of administration, but, despite this, the radioactivity of the lymphatic nodes in the sensitized animals during all periods was higher than in the control animals. One can assume that in the sensitized pigs the local lymphatic nodes

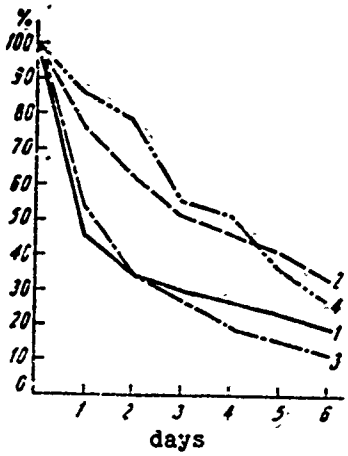

Figure 1. Radioactivity at the site of the administration of the allergen (in % to the initial value). Here and in Figs. 2, 3, 4 and 5: 1 is the lysed antigen, normal pigs; 2 is the lysed antigen, sensitized (immune) pigs; 3 is the corpuscular antigen, normal pigs; 4 is the corpuscular antigen, sensitized (immune) pigs.

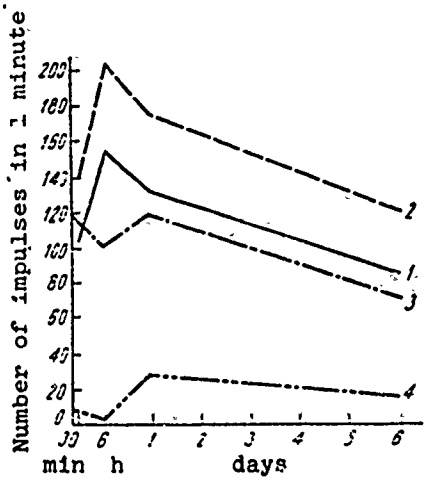

Figure 2. Radioactivity of local lymphatic nodes.

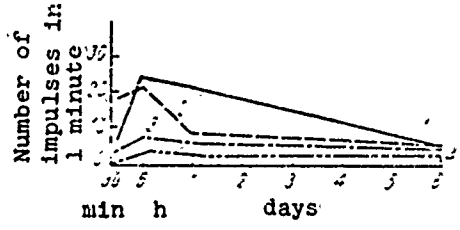

Figure 3. Radioactivity of the blood.

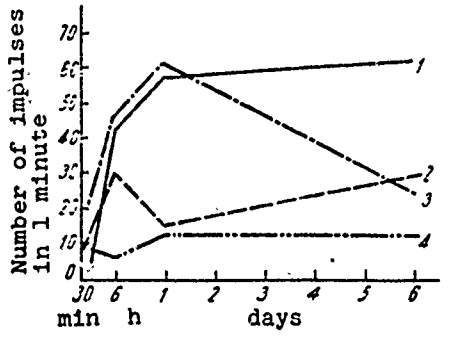

Figure 4. Radioactivity of the spleen.

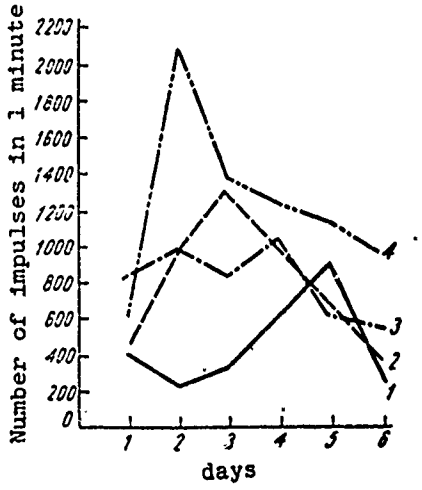

Figure 5. Radioactivity of the urine.

detained a considerable part of the lysed antigen passing through them, whereas in healthy animals, although the antigen also entered in a larger quantity, but it was carried away further by the lymph current. In the lymphatic nodes distant from the site of the administration (paraaortic, anterior inguinal) a similar pattern was observed, only the

general level of radioactivity was considerably less and thus the distinction between the experiment and the control turned out to be less precise.

The radioactivity of the blood was always at a low level, but with the administration of the lysed antigen it was higher than when using microbe cells. It is necessary to consider that the lysed allergen was administered two times less than the corpuscular, therefore, the differences in the rate of absorption of the two allergens, in actuality, were still more considerable. The radioactivity of normal animals was higher than in those which were immunized (Fig. 3).

The opposite pattern was observed in the bone marrow: with the total comparatively low radioactivity it proved to be higher than in the animals, that received the corpuscular antigen. It is known, that bone marrow is one of the favored places of Brucella localization.

The radioactivity curves in the liver and the spleen were approximately identical (Fig. 4).

Both in one and in the other group of animals the radioactivity of internal organs was less than in the sensitized pigs. This can be explained by the delay of the antigen at the site of administration, and in later periods also by its accelerated removal from the organism. In immune animals the concentration of radioactive isotopes in urine was significantly higher than in control animals, regardless of whether the lysed or corpuscular antigen (Fig. 5) was administered to them. Only in the first twenty-four hours after the administration of the corpuscular antigen an inverse relationship was observed, which was possible to explain by the considerable delay of the microbe cells at the site of administration.

Conclusions

1. In the guinea pigs, immunized by living brucellosis vaccine, during the subcutaneous administration of both microbe cells and a soluble antigen, their significant fixation at the site of the developed allergic inflammation was observed.

2. In the regional lymphatic nodes of immune animals a considerable part of the soluble antigen which entered them was fixed.

3. The radioactivity of the internal organs in the immunized animals was less than in the control animals, regardless of which antigen was administered to them.

4. The removal of the radioactive decay products of the antigens took place faster in the immune animals.

BIBLIOGRAPHY

Архипова О. П., Уварова О. А. Пробл. туб., 1962, № 2, с. 74.— Хрущева Н. Ф., Цой В. П., Арыкова М. А. и др. В кн.: Бруцеллез в Казахстане. Алма-Ата, 1965, с. 43.— Шапошников Э. М. В кн.: Микробная аллергия. Алма-Ата, 1967, с. 87.— Oort J., Turk I. L., Immunology, 1963, v. 6, p. 148.— Foldes J., Excerpta med. Sect. IV, 1965, v. 18, p. 895.— Pini A., Gambino O., Arch. vet. ital., v. 12, p. 481.